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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Reissue Application No.:
Filed: Herewith
Applicant: Eric Arthur Johnson
Patent No.: 5,726,079
Issued: March 10, 1998
For: THERMALLY ENHANCED FLIP CHIP
PACKAGE AND METHOD OF FORMING

SUPPLEMENTAL DECLARATION AND POWER OF ATTORNEY

Assistant Commissioner for Patents
Box Reissue Application
Washington, D.C. 20231

S I R :

The undersigned applicant, Eric Arthur Johnson, hereby declares that he believes himself to be the original, first, and only inventor of the invention described and claimed in U.S. Patent No. 5,726,079 and for which invention he solicits a reissue patent; that he does not know and does not believe that the invention was ever known or used in the United States before his invention thereof; that he has reviewed and understands the contents of U.S. Patent No. 5,726,079, including the claims; and that he believes the original patent to be defective or partly inoperative because (a) the claims include elements or limitations lacking antecedent basis and causing inconsistencies, rendering the claims potentially ambiguous; and (b) he claimed less than he had a right to claim in the original patent in one respect.

I. Amendments to Claim 1

A. Limitations Lacking Antecedent Basis And Having Inconsistencies

Specifically, upon review with his patent attorney, Mr. Lawrence R. Fraley, Esq., corporate patent counsel at International Business Machines Corporation, of the issued U.S. Patent No. 5,726,079 on or about August 1, 1998, the applicant determined that method claims 1 and 3 of the issued patent recite limitations lacking antecedent basis and having inconsistencies, rendering the claims potentially ambiguous. Mr. Fraley subsequently conferred with outside patent attorney, Mr. Kevin R. Casey, Esq. of Ratner & Prestia, Suite 301, One Westlakes, Berwyn, Valley Forge, PA 19482.

The '079 patent issued based on U.S. Patent Application Serial No. 08/715,212 filed on September 17, 1996 as a division of U.S. Patent Application Serial No. 08/666,155 filed on June 19, 1996 (now abandoned). Mr. Casey was working with Mr. Fraley on prosecution of U.S. Patent Application Serial No. 08/842,417 filed on April 24, 1997. The '417 application is a division of the '212 application from which the '079 patent issued. Mr. Fraley's work with Mr. Casey on prosecution of the related '417 application prompted, in part, his review of the claims of the '079 patent. The references listed on the Information Disclosure Statement submitted herewith were made of record during prosecution of the '417 application.

In reviewing the claims of U.S. Patent No. 5,726,079, it was determined that the last limitation of claim 1 incorrectly recites a "sealed covering." The step of the method which includes that limitation recites "removing said flip chip package from said sealed covering." The flip chip package (10) includes a thermally conductive planar member (22), a flip chip (12), and a substrate member (16). A sealed rigid dielectric covering (26) is formed about the edge surfaces of the thermally conductive planar member, the edge surfaces of the flip chip, and a predefined portion of the substrate member.

As the specification and prosecution history show, the package (10) is not removed from the sealed covering (26). The specification, at column 4, lines 2-3, states that removal of the package (10) is from the mold. Originally filed claim 5 (issued following prosecution as claim 1) recited removal from "said closed cavity." Accordingly, claim 1 has been revised to correctly recite that removal of the flip chip package is from the "mold cavity."

Another limitation in claim 1 recites that the "encapsulated flip chip package" comprises "said thermally conductive planar member, said flip chip, and said predefined portion of said substrate member." (Emphasis added.) In fact, the package includes more than the predefined portion of the substrate member; the package includes the entire substrate member. *See* specification at column 2, lines 33-54. Accordingly, submitted in the reissue application is an amended independent claim 1. Claim 1 does not recite the unnecessary limitation directed to "said predefined portion of" the substrate member.

B. Broadening Limitation

Upon further review with his patent attorney, the applicant also determined that the method disclosed in the patent, for forming a flip chip package, had not been subjected to the breadth of patent protection to which the applicant is entitled. As one object of his invention, the applicant states: "It is desirable to have a flip chip package that . . . is economical to manufacture." *See* specification at page 2, lines 7-9. To achieve that object, one of the concepts disclosed in the specification of the '079 patent is a method in which:

The assembled planar member, flip chip and substrate are placed in a mold cavity wherein a predefined portion of the substrate cooperates to form a substantially closed cavity. The moldable dielectric material is injected into the closed mold cavity and, after curing, forms a substantially rigid covering about the edges of the thermally conductive planar member, the flip chip, and the predefined portion of the substrate.

See specification from page 3, line 31 to page 4, line 7. For additional details, see specification on page 9, lines 1-16. The steps of the method outlined above are all recited in claim 1.

Claim 1 also recites, however, the step of “placing said thermally conductive planar member in thermally conductive communication with said upper surface of the flip chip.” Although the ‘079 patent teaches that step, the step is unnecessary to practice the invention. In reviewing the coverage provided by the claims of the ‘079 patent, for the method discussed above, it was determined that claim 1 was inadvertently drafted in excessively narrow terms and, therefore, does not encompass all that the applicant had a right to claim. Claim 1 is the broadest claim; that claim includes a limitation which is not believed necessary to practice the invention. In particular, claim 1 recites an additional step.

Accordingly, submitted in the reissue application is an amended independent claim 1. Claim 1 does not recite the unnecessary limitation to “placing said thermally conductive planar member in thermally conductive communication with said upper surface of the flip chip.” Rather, the limitation has been deleted from claim 1 and included in a new, dependent claim 4. The amendment to claim 1 has required minor amendments to claims 2 and 3 so that each of those claims now depend from claim 4.

II. Amendment to Claim 3

Dependent through claim 4 upon independent claim 1, claim 3 specifies that the step of placing the thermally conductive planar member “on” the upper surface of the flip chip includes bonding the planar member to the upper surface of the flip chip with a thermally conductive adhesive material. The limitation directed to placement “on” the upper surface lacks an antecedent basis. Claim 4 recites that the thermally conductive planar member is placed “in thermally conductive communication with” the upper surface of the flip chip. Therefore, claim 3 has been amended to recite that the step of placing the thermally conductive planar member “in thermally conductive communication with” the upper surface of the flip chip includes

bonding the planar member to the upper surface of the flip chip with a thermally conductive adhesive material.

III. Amendments to the Specification

Upon re-reading the '079 patent, a number of typographical and idomatic errors were discovered in the specification. Accordingly, the specification has been amended to correct these errors. Although no substantive changes have been made, the amended specification is submitted to conform this case to the formal requirements and long-established formal standards of U.S. Patent and Trademark Office practice, and to provide improved idiom and better grammatical form.

IV. Conclusion

Thus, submitted on November 18, 2004 were (and originally on August 24, 1999) amended claims 1-3 and new claim 4. I have review that amendment. The two features of claim 1 causing inconsistencies and rendering the claim potentially ambiguous have been deleted from ("predefined portion of said") or revised in ("sealed covering" revised to "mold cavity") the original claim. The unnecessarily narrowing feature to "placing said thermally conductive planar member in thermally conductive communication with said upper surface of the flip chip" has been deleted from claim 1 and included in claim 4. Claims 2 and 3 have been amended so that each of those claims now depend from claim 4. The feature lacking an antecedent basis in claim 3 has been revised to recite a feature ("in thermally conductive communication with") having an antecedent basis in claim 4.

Every error in the patent which was corrected in the present reissue application, and is not covered by a prior oath/declaration submitted in this application, arose without any deceptive intention on the part of the applicant.

The undersigned hereby appoints Paul F. Prestia, Reg. No. 23,031; Allan Ratner, Reg. No. 19,717; Kenneth N. Nigon, Reg. No.

The undersigned hereby appoints Paul F. Prestia, Reg. No. 23,031; Allan Ratner, Reg. No. 19,717; Kenneth N. Nigon, Reg. No. 31,549; Benjamin E. Leace, Reg. No. 33,412; Lawrence E. Ashery, Reg. No. 34,515; James C. Simmons, Reg. No. 24,842; Robert L. Andersen, Reg. No. 25,771; Christopher R. Lewis, Reg. No. 36,201; Daniel N. Calder, Reg. No. 27,424; Reg. No. 40,506; Jacques L. Etkowicz, Reg. No. 41,738; Christopher J. Dervishian, Reg. No. 42,480; Joshua L. Cohen, Reg. No. 38,040; Jack J. Jankovitz, Reg. No. 42,690; David L. Adour, Reg. No. 29,604; John R. Pivnichny, Reg. No. 43,001; Arthur J. Samodovitz, Reg. No. 31,297; William H. Steinberg, Reg. No. 28,540; William E. Schiesser, 53,559, Christopher A. Hughes, Reg. No. 26,914; Edward A. Pennington, Reg. No. 32,588; John E. Hoel, Reg. No. 26,279; and Joseph C. Redmond, Jr., Reg. No. 18,753, the address of each of whom is Ratner & Prestia, Suite 301, One Westlakes, Berwyn, P.O. Box 980, Valley Forge, Pennsylvania 19482-0980 as his attorneys and/or agents to prosecute the application, and to transact all business in the U.S. Patent and Trademark Office connected with the application.

The undersigned applicant hereby acknowledges the duty to disclose information which is material to the examination of the application in accordance with 37 C.F.R. § 1.56.

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The undersigned applicant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the

like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: _____

4/8/05

By: _____


Eric Arthur Johnson